CLAIM AMENDMENTS

1. (currently amended) A method for applying a metallurgical coating to a superalloy substrate having a cold worked surface layer and an underlying grain structure, the method comprising the steps of:

a) directing a water jet having a sufficient pressure against the surface of the superalloy substrate ~~for a sufficient time period~~ while traversing the surface at an effective sweep rate, to modify the surface morphology of the substrate in a such a manner so ~~that the surface roughness and surface volume of the substrate are increased at a microscopic and macroscopic level~~ as to remove the cold worked surface layer of the substrate and expose the underlying grain structure of the superalloy; and

b) depositing a metallurgical coating on the modified surface of the substrate by high velocity oxygen fuel spray.

2. (original) A method according to Claim 1, including depositing a metallurgical coating layer having a thickness ranging to and in excess of .500 inches.

3. (original) A method according to Claim 1, further comprising the step of grit blasting the surface of the substrate to increase surface roughness prior to treating the surface with a water jet.

4. (original) A method according to Claim 1, further comprising the step of heat treating the coated substrate.

5. (original) A method according to Claim 4, wherein the step of heat treating includes heat treating the coated substrate under vacuum.

6. (original) A method according to Claim 5, further comprising the step of subjecting the coated substrate to hot isostatic pressing.

7. (original) A method according to Claim 1, wherein the step of directing a water jet at the surface of the substrate includes directing a water jet at the surface at a pressure of about 55,000 psi.

8. (original) A method according to Claim 1, wherein the step of depositing a metallurgical coating on the surface of the substrate includes depositing a platinum aluminide metallurgical coating onto the surface of the substrate.

9. (original) A method according to Claim 1, wherein the step of depositing a metallurgical coating on the surface of the substrate includes depositing a MCrAlY metallurgical coating onto the surface of the substrate, wherein M is selected from the group consisting of Co, Ni and NiCo.

10. (currently amended) A method for applying a metallurgical coating to a superalloy substrate having a cold worked surface layer and an underlying grain structure, the method comprising the steps of:

a) roughening the surface of the superalloy substrate through grit blasting;

b) directing a water jet having a sufficient pressure against the roughened surface of the substrate ~~for a sufficient time period~~while traversing the surface at an effective sweep rate, to modify the surface morphology of the substrate in such a manner so as to remove the cold worked surface layer of the substrate and expose the underlying grain structure of the superalloy; and

c) depositing a metallurgical coating on the modified surface of the substrate by high velocity oxygen fuel spray.

11. (original) A method according to Claim 10, further comprising the step of vacuum heat treating the coated substrate.

12. (original) A method according to Claim 11, further comprising the step of subjecting the coated substrate to hot isostatic pressing.

13. (original) A method according to Claim 10, wherein the step of depositing a metallurgical coating on the surface of the substrate includes depositing a platinum aluminide metallurgical coating onto the surface of the substrate.

14. (original) A method according to Claim 10, wherein the step of depositing a metallurgical coating on the surface of the substrate includes depositing a MCrAlY metallurgical coating onto the surface of the substrate, wherein M is selected from the group consisting of Co, Ni and NiCo.

15. (currently amended) A method for applying a two-layer metallurgical coating system to a superalloy substrate having a cold worked surface layer and an underlying grain structure, the method comprising the steps of:

a) directing a water jet having a sufficient pressure against the surface of the superalloy substrate ~~for a sufficient time period~~ while traversing the surface at an effective sweep rate, to modify the surface morphology of the substrate in such a manner so as to remove the cold worked surface layer of the substrate and expose the underlying grain structure of the superalloy;

b) depositing a first metallurgical coating layer onto the modified surface of the substrate by high velocity oxygen fuel spray;

c) directing a water jet having a sufficient pressure against the surface of the first metallurgical coating layer for a sufficient time period to modify the surface morphology of the first metallic coating layer; and

d) depositing a second coating layer onto the modified surface of the first metallurgical coating layer.

16. (original) A method according to Claim 15, further comprising the step of grit blasting the surface of the substrate to increase surface roughness prior to treating the surface of the substrate with a water jet.

17. (original) A method according to Claim 15, wherein the step of depositing a second coating layer onto the modified surface of the first metallurgical coating layer includes deposition of a second metallurgical coating layer onto the modified surface of the first metallurgical coating layer by high velocity oxygen fuel spray.

18. (original) A method according to Claim 15, wherein the step of depositing a second coating layer onto the modified surface of the first metallurgical coating layer includes deposition of a ceramic coating layer onto the modified surface of the first metallurgical coating layer by plasma thermal spray.

19. (original) A method according to Claim 18, wherein the step of depositing a second coating layer includes deposition of a 6-8 weight % Yttria stabilized zirconium oxide ceramic thermal barrier coating over the modified surface the first metallurgical coating layer.

20. (original) A method according to Claim 17, wherein the deposition of at least one of the first and second metallurgical coating layers includes the step of depositing a platinum aluminide metallurgical coating.

21. (original) A method according to Claim 17, wherein the deposition of at least one of the first and second metallurgical coating layers includes the step of depositing a MCrAlY metallurgical coating, wherein M is selected from the group consisting of Co, Ni and NiCo.

22. (original) A method according to Claim 15, further comprising the step of vacuum heat treating the coated substrate prior to deposition of the second coating layer.

23. (original) A method according to Claim 22, further comprising the step of subjecting the coated substrate to hot isostatic pressing prior to deposition of the second coating layer.

24. (currently amended) A method for applying a three-layer metallurgical coating system to a superalloy substrate having a cold worked surface layer and an underlying grain structure, the method comprising the steps of:

a) directing a water jet having a sufficient pressure against the surface of the superalloy substrate ~~for a sufficient time period~~ while traversing the surface at an effective sweep rate, to modify the surface morphology of the substrate in such a manner so as to remove the cold worked surface layer of the substrate and expose the underlying grain structure of the superalloy; and

b) depositing a first metallurgical coating layer onto the modified surface of the substrate by high velocity oxygen fuel spray;

c) directing a water jet having a sufficient pressure against the surface of the first metallurgical coating layer for a sufficient time period to modify the surface morphology of the first metallurgical coating layer;

d) depositing a second metallurgical coating layer onto the modified surface of the first metallurgical coating layer by high velocity oxygen fuel spray;

e) directing a water jet having a sufficient pressure against the surface of the second metallurgical coating layer for a sufficient time period to modify the surface morphology of the second coating layer; and

f) depositing a third coating layer onto the modified surface of the second metallurgical coating layer.

25. (original) A method according to Claim 24, further comprising the step of grit blasting the surface of the substrate to increase surface roughness prior to treating the surface of the substrate with a water jet.

26. (original) A method according to Claim 24, wherein the step of depositing a third coating layer onto the modified surface of the second metallurgical coating layer includes deposition of a ceramic coating layer onto the modified surface of the second metallurgical coating layer by plasma thermal spray.

27. (original) A method according to Claim 26, wherein the step of depositing a third coating layer includes deposition of a 6-8 weight % Yttria stabilized zirconium oxide ceramic thermal barrier coating over the modified surface the second metallurgical coating layer.

28. (original) A method according to Claim 24, wherein the deposition of at least one of the first and second metallurgical coating layers includes the step of depositing a platinum aluminide metallurgical coating.

29. (original) A method according to Claim 24, wherein the deposition of at least one of the first and second metallurgical coating layers includes the step of depositing a MCrAlY metallurgical coating, wherein M is selected from the group consisting of Co, Ni and NiCo.

30. (original) A method according to Claim 24, further comprising the step of vacuum heat treating the coated substrate prior to deposition of the second coating layer.

31. (original) A method according to Claim 30, further comprising the step of subjecting the coated substrate to hot isostatic pressing prior to deposition of the second coating layer.

32. (withdrawn) A gas turbine component made by a process comprising the steps of:

a) providing a gas turbine component defining a superalloy substrate;

b) directing a water jet having a sufficient pressure against the surface of the superalloy substrate for a sufficient time period to modify the surface morphology of the substrate; and

c) depositing a metallurgical coating layer onto the modified surface of the substrate by high velocity oxygen fuel spray.

33. (withdrawn)A gas turbine component made by a process comprising the steps of:

a) providing a gas turbine component defining a superalloy substrate;

b) roughening the surface of the substrate through grit blasting;

c) directing a water jet having a sufficient pressure against the roughened surface of the substrate for a sufficient time period to modify the surface morphology of the substrate; and

d) depositing a metallurgical coating on the modified surface of the substrate by high velocity oxygen fuel spray.

34. (new) A method for applying a metallurgical coating to a superalloy substrate having a cold worked surface layer and an underlying grain structure, the method comprising the steps of:

a) traversing the surface of the substrate with a water jet having a pressure of about between 45,000 to 65,000 psi at a sweep rate of about between 25 to 100 inches per minute so as to remove the cold worked surface layer of the substrate and expose the underlying grain structure of the superalloy; and

b) depositing a metallurgical coating on the modified surface of the substrate by high velocity oxygen fuel spray.

35. (new) A method according to Claim 34, wherein the water jet has a stand-off distance relative to the surface of the substrate of about between .355 to 1.00 inches.

36. (new) A method according to Claim 34, wherein the water jet has a step distance of about between .03 to .10 inches.

37. (new) A method according to Claim 34, wherein the water jet has an orifice size of about between .010 to .016 inches.

38. (new) A method according to Claim 1, wherein the pressure of the water jet is about between 45,000 to 65,000 psi.

39. (new) A method according to Claim 1, wherein the effective sweep rate of the water jet is about between 25 to 100 inches per minute.

40. (new) A method according to Claim 10, wherein the pressure of the water jet is about between 45,000 to 65,000 psi.

41. (new) A method according to Claim 10, wherein the effective sweep rate of the water jet is about between 25 to 100 inches per minute.

42. (new) A method according to Claim 15, wherein the pressure of the water jet is about between 45,000 to 65,000 psi.

43. (new) A method according to Claim 15, wherein the effective sweep rate of the water jet is about between 25 to 100 inches per minute.

44. (new) A method according to Claim 24, wherein the pressure of the water jet is about between 45,000 to 65,000 psi.

45. (new) A method according to Claim 24, wherein the effective sweep rate of the water jet is about between 25 to 100 inches per minute.

46. (new) A method for applying a metallurgical coating to a superalloy substrate having a cold worked surface layer and an underlying grain structure, the method comprising the steps of:

a) removing the cold worked surface layer of the substrate to expose the underlying grain structure of the superalloy by high pressure water jet treatment; and

b) depositing a metallurgical coating on the water jet treated surface of the substrate by high velocity oxygen fuel spray.